FRONT-END DESIGN FOR NON-INVASIVE ELECTRICAL RESISTANCE TOMOGRAPHY FOR LIQUID COLUMN

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***Abstract*— This paper explains the front-end design for non-invasive electrical resistance tomography. The electrical resistance tomography system presented in this paper uses high frequency potential. In this design, the phase-shift demodulation (PSD) approach was eliminated and replaced by a peak detector circuit. The switching between transmitter/ receiver and the transmitting channel was controlled by analogue switch, MAX319 and demultiplexer, DG406, respectively. A microcontroller was applied as the data acquisition which eliminates the needs of a data acquisition system. Sensor readings of each receiver from each transmitter groups were tested experimentally, compared and analysed with simulation results. These experimental readings were compared with the sensors reading simulated from COMSOL Multiphysics software. As a result, the current values between 0-1mA from experiments was similar with the simulation results for all groups of transmitters. Thus, it can be concluded that the front-end design can be applied for the non-invasive ERT when high frequency is considered.**

***Index Terms*— Non-Invasive; ERT; high frequency.**